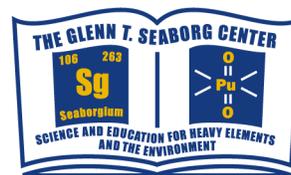




# Glenn T. Seaborg Center Seminar



Corwin Booth  
The Glenn T. Seaborg Center  
Chemical Sciences Division  
Lawrence Berkeley National Laboratory

## What does the term “heavy fermion” mean to you, and why should you care?

Wednesday, June 11, 2003

4 pm

Building 70A-3377

When a small amount of a magnetic impurity is doped into a nonmagnetic, metallic host, the impurity spins can polarize the conduction electrons in such a way as to cancel the total magnetic moment, creating a so-called “Kondo” non-magnetic state. A similar state can be formed using  $4f$  or  $5f$  ions, *even in concentrated systems*. These  $f$ -electron intermetallic systems can display a wide range of magnetic and non-magnetic behavior, including a variant of superconductivity that is reminiscent of the high-temperature superconducting cuprates. In this talk, I will discuss how mixed valence arises in these systems, with heavy fermion behavior as a limiting form. Fundamental aspects of concentrated systems will be stressed, with possible connections to molecular organometallic systems considered. Various other aspects, such as non-Fermi liquid behavior, will also be presented. Finally, the effect of lattice disorder will be discussed. All of these subjects will be defined as simply as possible. If you are nice, I’ll tell you what I mean by the following graphic:

